

### **Remarks**

The Office action mailed October 20, 2004, has been carefully reviewed and considered. Claims 20-39, 46-53, 57-58, 64-79 and 82 have been cancelled. Claims 3-7, 12, 14, 15, 17-19, 59-63, 80 and 81 have been withdrawn. New claims 83-103 have been added. Claims 1-8, 10, 12, 13, 16-19, 40, 44, 45, 54-56, 61, 63 and 81 have been amended. After entry of this amendment, claims 1-19, 40-45, 54-56, 59-63, 80, 81 and 83-103 should be pending.

#### ***I. Election of Species***

Applicants acknowledge the expanded list of claims under examination. The remaining claims have been withdrawn. Withdrawn claims directed to non-elected species should be examined if at least one corresponding generic claim is found to be allowable. M.P.E.P. § 809.04. Accordingly, the withdrawn claims have been amended in a manner consistent with the claims under examination. New claims 83-103 read on the elected species.

#### ***II. Claim Rejections - 35 U.S.C. § 112***

Claims 1, 2, 8-10, 13, 16-18, 40-45 and 54-56 were rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. Applicants respectfully traverse this rejection.

The Examiner alleges a conflict between the phrase “two-dimensional” in claims 1, 44 and 54 and the three-dimensional shape of the motor arrangements of elected species A. To address this alleged conflict, claims 1 and 54 and their dependent claims have been amended to remove the phrase “two-dimensional.” Claim 44 has been converted into a dependent claim.

The Examiner alleges a conflict between the word “rotary” in the preamble of claim 1 and the word “move” in the body of claim 1. To address this alleged conflict, claim 1 and its dependent claims have been amended to change the word “move” to the word “rotate.”

The Examiner alleges a conflict between the word “molecular” in the preambles of claims 1, 44 and 54 and the word “protein” in the bodies of these claims. To address this alleged conflict, claims 1 and 54 and their dependent claims have been amended to replace the word “protein” with the word “molecule.” Claim 44 has been converted into a dependent claim. To clarify, the word “molecular” in the preambles of claims 1 and 54 merely indicates that the claimed motors use molecular interactions to generate mechanical work. It would be

inconsistent with the plain meaning of the claims and with the specification to read the preambles to indicate that the components of the claimed motors are non-elemental in nature.

Claim 16 has been rewritten in independent form including all of the limitations of claims 1 and 2 with the amendments discussed above. Since the 35 U.S.C. § 112 rejection discussed above is the only rejection applied to claim 16, claim 16 should now be in condition for allowance.

### *III. Claim Rejections - 35 U.S.C. § 102*

Claims 1, 2, 9, 10, 13, 17, 18, 40, 41, 43, 44 and 54 were rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Thomas et al., "The Physics of Biological Molecular Motors," *J. Phys. D: Appl. Phys.*, Vol. 31, pp. 253-266 (1998) ("Thomas et al."). Applicants respectfully traverse this rejection.

The portion of Thomas et al. cited by the Examiner describes kinesin-tubulin and dynein-tubulin molecular motors that occur in nature. As illustrated in Thomas et al. Figure 4a, the disclosed molecular motors include motor proteins that move **along** microtubules. The molecular motors disclosed in Thomas et al. do not include any rotating elements. In contrast, claim 1, as amended, discloses molecular motors that include at least one rotating element.

With respect to claim 54, the Examiner alleges that the perforations recited in claim 54 are found in the prior art because "[t]he ATP must necessarily travel into the motor via some type of permeation/perforations in order to interact with the motor proteins." October 20, 2004 Office action at page 4. However, Thomas et al. is conspicuously silent regarding the presence of such perforations. If the Examiner persists in the rejection of claim 54, Applicants respectfully ask that the Examiner cite prior art describing such perforations. Perforations are not found in the molecular motors in muscle tissue. Instead, mitochondria are distributed around the motor molecules to supply ATP directly. Mitochondria occur only in living organisms, so alternative approaches to providing fuel to the motor molecules had to be developed. Perforating the surfaces adjacent to the motor molecules was one method developed for addressing this problem.

The Examiner alleges that claims 17 and 18 are anticipated by genetic selection. Claims 17 and 18 have been amended for clarity. Rather than the act of preselection, these claims are directed to the relationship between the dimensions of the arrays and the power output of the

motor. Furthermore, since the molecular motor of claim 1 does not occur in nature, natural selection cannot result in the claimed predetermined dimension.

#### ***IV. Claim Rejections - 35 U.S.C. § 101***

Claims 1, 2, 9, 10, 13, 17, 18, 40, 41, 43, 44 and 54 were rejected under 35 U.S.C. § 101 as allegedly being directed to non-statutory subject matter. Applicants respectfully traverse this rejection.

As discussed above, the molecular motors of claims 1 and 54 are distinguishable from any molecular motor found in nature. This is partially because claim 1 recites molecular motors that include at least one rotating element and claim 54 recites molecular motors that include perforations. Rotating elements and perforations are not found in the molecular motors disclosed in Thomas et al. or in any other molecular motors found in nature. Therefore, the molecular motors of claims 1 and 54 are “nonnaturally occurring manufacture[s]” that qualify as patentable subject matter. M.P.E.P. § 2105 quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 206 USPQ 193 (1980).

#### ***V. Dependent Claims***

All rejected dependent claims depend from a rejected independent claim and are allowable for the reasons stated for each independent claim. Each of the dependent claims is further allowable in view of the patentable combination of features recited in such dependent claim.

#### ***VI. New Claims***

Applicants have added claims 83-103 to further claim the patentable features of the invention. Support for new claims 83-103 can be found, for example, in the specification and originally filed claims as follows:

Claim 83: page 5, lines 5-10; page 6, lines 2-7; and originally filed claim 12  
Claim 84: page 5, lines 5-10; page 6, lines 2-7; and originally filed claim 12  
Claim 85: page 5, lines 14-16; and page 5, line 29 to page 6, line 2  
Claim 86: page 5, lines 3-4; and originally filed claim 2  
Claim 87: page 12, line 25 to page 14, line 4; and originally filed claim 1  
Claim 88: page 5, lines 17-18; and originally filed claim 8  
Claim 89: page 8, lines 25-27; page 12, lines 26-27; and page 13, lines 13-15

Claim 90: page 5, lines 14-16; and page 5, line 29 to page 6, line 2  
Claim 91: page 5, lines 5-10; page 6, lines 2-7; and originally filed claim 12  
Claim 92: page 5, lines 5-10; page 6, lines 2-7; and originally filed claim 12  
Claim 93: page 20, line 30 to page 21, line 3; and Figure 1  
Claim 94: page 12, line 25 to page 14, line 4; and originally filed claim 1  
Claim 95: page 8, lines 25-27; page 12, lines 26-27; and page 13, lines 13-15  
Claim 96: page 7, line 28 to page 8, line 2; page 8, lines 25-27; and page 12, lines 26-27  
Claim 97: page 12, line 25 to page 14, line 4; and originally filed claim 1  
Claim 98: page 7, line 28 to page 8, line 2; page 8, lines 25-27; and page 12, lines 26-27  
Claim 99: page 5, lines 5-10; page 6, lines 2-7; and originally filed claim 12  
Claim 100: page 5, lines 5-10; page 6, lines 2-7; and originally filed claim 12  
Claim 101: page 12, line 25 to page 14, line 4; and originally filed claim 1  
Claim 102: page 7, line 28 to page 8, line 2; page 8, lines 25-27; and page 12, lines 26-27  
Claim 103: page 8, lines 3-6; and originally filed claim 32

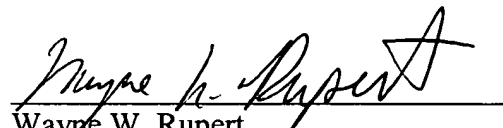
### ***VII. Conclusion***

It is respectfully submitted that the present claims are in condition for allowance. Should there be any questions regarding this application, Examiner Marschel is invited to contact the undersigned attorney at the telephone number shown below.

Respectfully submitted,

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